

CLAIMS:

1. A polishing composition used in precision polishing a wafer surface, the polishing composition comprising:

5 silicon dioxide, wherein the silicon dioxide is colloidal silica or fumed silica;

wherein, when the silicon dioxide is colloidal silica, an average primary particle diameter  $D_{SA}$  of the colloidal silica, which is obtained from a specific surface area of the colloidal silica measured by a BET method, is from 5 to 30 nm; wherein an average secondary particle diameter  $D_{N4}$  of the colloidal silica, which is measured by a laser scattering method, is from 5 to 120 nm;

15 wherein, when the silicon dioxide is fumed silica, an average primary particle diameter  $D_{SA}$  of the fumed silica, which is obtained from a specific surface area of the fumed silica measured by a BET method, is from 5 to 30 nm; and wherein an average secondary particle diameter  $D_{N4}$  of the fumed silica, which is measured by a laser scattering method, is from 5 to 200 nm; an alkaline compound; a water-soluble polymer; and water.

25 2. The polishing composition according to claim 1, wherein the average primary particle diameter  $D_{SA}$  of the colloidal silica and the fumed silica is from 5 to 25 nm.

30 3. The polishing composition according to claim 2, wherein the average primary particle diameter  $D_{SA}$  of the colloidal silica and the fumed silica is from 5 to 20 nm.

35 4. The polishing composition according to claim 1, wherein the average secondary particle diameter  $D_{N4}$  of the colloidal

silica is from 5 to 100 nm.

5. The polishing composition according to claim 4, wherein the average secondary particle diameter  $D_{N4}$  of the colloidal silica is from 5 to 80 nm.

6. The polishing composition according to claim 1, wherein the silicon dioxide is colloidal silica.

7. The polishing composition according to claim 1, wherein the water-soluble polymer is at least one selected from hydroxyethyl cellulose, polyvinyl alcohol, and polyethylene oxide.

8. The polishing composition according to claim 7, wherein the water-soluble polymer is hydroxyethyl cellulose.

9. The polishing composition according to claim 8, wherein content of the hydroxyethyl cellulose in the polishing composition is from 0.005 to 1.5 wt%.

10. The polishing composition according to claim 1, wherein the alkaline compound is at least one selected from potassium hydroxide, sodium hydroxide, ammonia, tetramethylammonium hydroxide, anhydrous piperazine, and piperazine hexahydrate.

11. A method of polishing a wafer, the method comprising:  
preparing a polishing composition, wherein the polishing composition includes:

silicon dioxide, wherein the silicon dioxide is colloidal silica or fumed silica;

wherein, when the silicon dioxide is colloidal silica, an average primary particle diameter  $D_{SA}$  of the colloidal silica, which is obtained from a specific surface area of the colloidal silica

measured by a BET method, is from 5 to 30 nm;  
wherein an average secondary particle diameter  $D_{N4}$   
of the colloidal silica, which is measured by a  
laser scattering method, is from 5 to 120 nm;

5        wherein, when the silicon dioxide is fumed  
silica, an average primary particle diameter  $D_{SA}$  of  
the fumed silica, which is obtained from a specific  
surface area of the fumed silica measured by a BET  
method, is from 5 to 30 nm, and wherein an average  
10       secondary particle diameter  $D_{N4}$  of the fumed silica,  
which is measured by a laser scattering method, is  
from 5 to 200 nm;

an alkaline compound;

a water-soluble polymer; and

15       water; and

precision polishing a surface of the wafer using the  
polishing composition.